Data Quality Issues and Data Review for Low-level Perchlorate Analysis

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Strategy for evaluating data quality

- Know what concentration levels are necessary for making decisions
- Establish Reporting Limits based on calibration standards (not PQLs)
- Support the Reporting Limits with Method Detection Limit studies
- Establish meaningful matrix spike samples
- Review the raw data

Uses for perchlorate and sources for the environment

- Solid rocket propellant – missiles
  - Matches
  - Road flares
  - Military Pyrotechnics
  - Fireworks
- Found at military bases

MMR
Massachusetts Military Reservation

- Also known as Camp Edwards and Otis Air Force Base
- Located over the sole source aquifer on Cape Cod
- Several plumes affect public and private wells both on and off base
- Plumes contain mainly TCE, PCE, EDB, or Explosives (RDX) and perchlorate

MMR (continued)

- Impact Area is over the highest point of the groundwater table
- Perchlorate is associated with explosives and propellants
  - Most releases associated with military training and munitions disposal

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- Perchlorate sampling and analysis program run by the National Guard Bureau with the ACOE – analyzing to 1 ppb to characterize the site
- Detections of perchlorate in the wellfield and water supply wells in Bourne, MA at up to 1 ppb
- Wide spread disbelief that the data were reliable

QA Steps In – Assessing Data Quality

- Reviewed a raw data package
  - Chromatograms and calibrations were key
- Requested MDL studies and SOPs
- EPA audited the laboratory
- Proof is in the data
  - The data supported that the lab was able to generate quantifiable data at 1 ppb
  - Samples had little to no interference –

    Low conductivity and low turbidity

July 30, 2002 QA Memo

- Jointly issued: RPM and QA
- Institution of steps to help establish data of sufficient quality to support quantitations at 1 ppb
- Based on modification of Method 314.0 but does not prescribe methods or instrumentation

Key Points

- Establish reporting limit at 1.0 ppb with a low calibration standard
- Use a 1.0 ppb standard for the MDL study
- Run a daily MDL check standard at 0.5 ppb (Acceptance criteria 50-150%)

Key Points - continued

- Limit method blank contamination to less than the MDL – this requirement applies to pretreatment cartridges as well
- Use 10 ppb spikes – LCS, MS and MSD (50 ppb spikes are listed in 314.0)

Current Status

- Started with a single laboratory capable of meeting these quality control criteria
- Now have 4 labs that can consistently produce data of known and documented quality at the 1 ppb reporting limit for water
- Confirmed through split samples and PE samples

Confidence in the Data

- The National Guard Bureau (and the Army Corps), Massachusetts and EPA Region 1 have confidence that reliable data is being produced.